

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

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24 JAN 2005

**BARKER BRETELL
LONDON**

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year)

24.01.2005

Applicant's or agent's file reference
LB1876

IMPORTANT NOTIFICATION

International application No.
PCT/GB 03/04400

International filing date (day/month/year)
10.10.2003

Priority date (day/month/year)
11.10.2002

Applicant
PURSUIT DYNAMICS PLC

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international
preliminary examining authority:



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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference LB1876		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB 03/04400	International filing date (day/month/year) 10.10.2003	Priority date (day/month/year) 11.10.2002	
International Patent Classification (IPC) or both national classification and IPC F04F5/46			
Applicant PURSUIT DYNAMICS PLC			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 1 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand 29.04.2004		Date of completion of this report 24.01.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patenilaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Kolby, L. Telephone No. +31 70 340-2204 	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB 03/04400

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-36 as originally filed

Claims, Numbers

3-48 as originally filed

1, 2 received on 12.10.2004 with letter of 08.10.2004

Drawings, Sheets

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-48
	No: Claims	
Inventive step (IS)	Yes: Claims	1-48
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-48
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following document:

D2: PATENT ABSTRACTS OF JAPAN vol. 016, no. 498 (M-1325), 15 October 1992 (1992-10-15) -& JP 04 184000 A (MITSUI ENG & SHIPBUILD CO LTD), 30 June 1992 (1992-06-30)

2. The application does not meet the requirements of Article 6 PCT, because the amended claim 1 is not clear.

2.1 The unclear wording from claim 1 is the following (see wording in bold): "... by the introduction of the transport fluid through the nozzle (16) **into a pseudo convergent-divergent section bounded by a wall of the mixing chamber (3A)** and subsequent condensation of the transport fluid.

The definition of the pseudo convergent-divergent section in the amended claim 1, is not clear for the reader. Furthermore, the used wording can not be found in the application as original filed.

2.2 From the description as a whole and in particular §14 and the independent method claim 23, it is clear that the pseudo convergent-divergent section is generated/created **in the working fluid flow** by the introduction of transport fluid through the nozzle.

The above unclear wording has therefore for the examination been interpreted as follows: "... by the introduction of the transport fluid through the nozzle (16) and subsequent condensation thereof and whereby a pseudo-convergent/divergent section is created in the working fluid flow in the mixing chamber (3A) by the introduction of the transport fluid through the nozzle (16).

3. The document D2 is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):

A fluid mover (10) wherein a hollow body (11,12) provided with a straight-through passage, an inlet at one end of the passage and an outlet at the other end of the passage for the entry and discharge respectively of a working fluid, a nozzle (40)

substantially circumscribing and opening into said passage intermediate the inlet and outlet ends thereof, an inlet communicating with the nozzle (40) for the introduction of a transport fluid, and a downstream pipe/a mixing chamber (12) being formed within the passage downstream of the nozzle (40), the nozzle being of convergent-divergent geometry internally thereof.

3.1 The subject-matter of claim 1 differs from this known fluid mover in that:

a) the straight-through passage has to be of substantially constant cross section. In the document D2, the outlet cross section (12) is designed to be slightly greater than the inlet section (11).

b) the nozzle (16) and mixing chamber (3A) being so disposed and configured that in use a dispersed droplet flow regime and a supersonic shockwave are created within the mixing chamber (3A) by the introduction of the transport fluid through the nozzle (16) and subsequent condensation thereof and whereby a pseudo-convergent/divergent section is created in the working fluid flow in the mixing chamber (3A) by the introduction of the transport fluid through the nozzle (16).

3.2 The fluid mover of document D2 is designed for compressive fluids, whereby no dispersed droplet regime will occur. Furthermore, the nozzle of document D2 is provided with a rectifying section whereby only a small amount of mixing will occur in the downstream pipe/mixing chamber (12) (see the parallel lines in Fig. 1 and flow arrows in Figs. 3-5 of D2). Consequently, also no pseudo-convergent/divergent section is created in the working fluid flow in the mixing chamber by the introduction of the transport fluid through the nozzle.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

3.2 The problem to be solved by the present invention may be regarded as providing a fluid mover having improved performance.

3.3 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) as the solution is not rendered obvious by the document D1 or by any other prior art documents nor by a combination of any other prior art designs, since the state of the art does not offer any hints towards this solution.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB 03/04400

- 3.4 Also the corresponding independent method claims 23 and 24 meet the requirements of the PCT with respect to novelty and inventive step.
- 3.5 Claims 2-22 are dependent on claim 1, claims 25-48 are dependent on claim 23 and/or claim 24. These dependent claims do as such also meet the requirements of the PCT with respect to novelty and inventive step.
- 3.6 The invention is industrial applicable in the field of fluid moving, for example in pumping applications (Article 33(4) PCT).

CLAIMS

1. A fluid mover (1) characterised by a hollow
body (2) provided with a straight-through passage
5 (3) of substantially constant cross section,
an inlet (4) at one end of the passage and an outlet
(5) at the other end of the passage (3) for the
entry and discharge of a working fluid,
a nozzle (16) substantially circumscribing and
10 opening into said passage (3) intermediate the inlet
and outlet ends (4, 5) thereof,
an inlet (10) communicating with the nozzle (16) for
the introduction of a transport fluid, and
a mixing chamber (3A) being formed within the
15 passage (3) downstream of the nozzle (16),
the nozzle (16) being of convergent-divergent
geometry internally thereof such as in use to
provide for the generation of supersonic flow of the
transport fluid therein,
20 the nozzle (16) and mixing chamber (3A) being so
disposed and configured that in use a dispersed
droplet flow regime and a supersonic shockwave are
created within the mixing chamber (3A) by the
introduction of the transport fluid through the
25 nozzle (16) into a pseudo convergent-divergent
section bounded by a wall of the mixing chamber (3A)
and subsequent condensation of the transport fluid.
2. A fluid mover according to Claim 1
30 characterised in that the nozzle (16) is a steam
nozzle, the inlet (10) is a steam inlet and the
transport fluid is steam.